

WHAT IS CLAIMED IS:

1. An image display device provided with an active-matrix substrate comprising:

an insulating substrate; and

5 a plurality of circuit regions fabricated on said insulating substrate and including at least a pixel section and a pixel-driving circuit section, each of said pixel section and said pixel-driving circuit section having a polycrystalline silicon semiconductor film,

wherein at least one of said plurality of circuit regions has  
10 a first type of a thin film transistor and a second type of a thin film transistor, and

a direction of a current flowing through a channel of said first type of a thin film transistor is different from that of a current flowing through a channel of said second type of a thin film  
15 transistor.

2. An image display device provided with an active-matrix substrate comprising:

an insulating substrate; and

20 a plurality of circuit regions fabricated on said insulating substrate and including at least a pixel section and a pixel-driving circuit section, each of said pixel section and said pixel-driving circuit section having a polycrystalline silicon semiconductor film,

wherein said plurality of circuit regions includes at least one  
25 pair of a first circuit region and a second circuit region,

all thin film transistors in said first circuit region flow currents through channels thereof in a first direction,

all thin film transistors in said second circuit region flow currents through channels thereof in a second direction, and

5       said first direction is different from said second direction.

3. An image display device according to claim 1, wherein said plurality of circuit regions includes at least one pair of a first-type circuit region and a second-type circuit region,

10       all thin film transistors in said first-type circuit region flow currents through channels thereof in one direction, and

directions of currents flowing through channels of thin film transistors in said second-type circuit region are plural in number.

15       4. An image display device according to claim 3, wherein said one direction is same in all of said first-type circuit regions included in said plurality of circuit regions.

5. An image display device according to claim 3, wherein, in  
20       said first-type circuit region, a peak-to-valley height difference of a surface of said channel, a source region and a drain region of said thin film transistors is equal to or smaller than 5 nm, and crystalline grains of said polycrystalline silicon semiconductor film are of a rectangular shape of 0.3  $\mu\text{m}$  to 2  $\mu\text{m}$  in width and 4  $\mu\text{m}$  or  
25       more in length; and

in said second-type circuit region, an average crystalline grain diameter is  $1 \mu m$  or smaller and a peak-to-valley height difference of a surface is equal to or greater than 20 nm, in said channel, a source region and a drain region of said thin film  
5 transistors.

6. An image display device according to claim 1, wherein said thin film transistors of said first and second types are fabricated from polycrystalline silicon films having plural kinds of surface  
10 configurations, and

said thin film transistors constituting at least one of said plurality of circuit regions are such that a peak-to-valley height difference of a surface of said channel, a source region and a drain region of said thin film transistors is equal to or smaller than 5 nm, and crystalline grains of said polycrystalline silicon film are  
15 of a rectangular shape of  $0.3 \mu m$  to  $2 \mu m$  in width and  $4 \mu m$  or more in length.

7. An image display device according to claim 1, wherein said thin film transistors of said first and second types have plural kinds of gate insulating materials and plural kinds of thickness in each  
20 of said plurality of circuit regions.

8. An image display device according to claim 1, wherein said thin film transistors of said first and second types have plural kinds  
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of structures in each of said plurality of circuit regions.

9. An image display device provided with an active-matrix substrate having

5        a plurality of circuit regions fabricated on one insulating substrate and including at least a pixel section and a pixel-driving circuit section, each of said pixel section and said pixel-driving circuit section having thin film transistors formed of polycrystalline silicon films,

10        wherein an average crystalline grain diameter is 1  $\mu\text{m}$  or smaller and a peak-to-valley height difference of a surface is equal to or greater than 20 nm, in said polycrystalline silicon films in said channel, a source region and a drain region of said thin film transistors constituting one of said plurality of circuit regions  
15        constituting said pixel section; and

      in at least one of said plurality of circuit regions excluding said one of said plurality of circuit regions constituting said pixel section, crystalline grains of said polycrystalline silicon film are of a rectangular shape of 0.3  $\mu\text{m}$  to 2  $\mu\text{m}$  in width and 4  $\mu\text{m}$  or more  
20        in length in a channel, a source region and a drain region of said thin film transistors, and a peak-to-valley height difference of a surface of said channel, said source region and said drain region of said thin film transistors is equal to or smaller than 5 nm.

25        10. An image display device according to claim 9, wherein said

thin film transistors have plural kinds of gate insulating materials and plural kinds of thickness in ones of said plurality of circuit regions excluding said one of said plurality of circuit regions constituting said pixel section.

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11. An image display device according to claim 9, wherein said thin film transistors have plural kinds of structures in ones of said plurality of circuit regions excluding said one of said plurality of circuit regions constituting said pixel section.

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12. An image display device according to claim 9, wherein a level shifter, a sampling switch circuit and a buffer circuit constituting a pixel-driving circuit are fabricated in ones of said plurality of circuit regions excluding said one of said plurality of circuit regions constituting said pixel section,

said channel, said source region and said drain region of said thin film transistors constituting said pixel-driving circuit are formed of polycrystalline silicon films having an average crystalline grain diameter of 1  $\mu$  m or smaller and a peak-to-valley height difference of a surface equal to or greater than 20 nm, and  
20 said channel, said source region and said drain region of said thin film transistors constituting at least one of said circuits excluding said level shifter and said sampling switch circuit are formed of polycrystalline silicon films having crystalline grains of a rectangular shape of 0.3  $\mu$  m to 2  $\mu$  m in width and 4  $\mu$  m or more in  
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length and a peak-to-valley height difference of a surface equal to or smaller than 5 nm.